



**US Army Corps
of Engineers**

Jacksonville District

Superfund Five-Year Review Report

Davie Landfill

Davie, Broward County, Florida

Prepared for
U.S. Environmental Protection Agency, Region IV
May 2000

Preliminary Information

Site name: Davie Landfill		EPA ID: FLD980602288
Region: 04	State: Florida	City/County: Broward County
LTRA* (highlight): Y N		Construction completion date: 2/7/95
Fund/PRP Lead: PRP		NPL status: Final
Lead agency: EPA, Region 4		
Who conducted the review (EPA Region, state, Federal agencies or contractor): US Army Corps of Engineers, Jacksonville District		
Dates review conducted: From 2/14/00 To: 5/1/00		Dates(s) of site visit: 3/20/00
Whether first or successive review: Successive Review		
Circle: Statutory Policy		Due date: 3/14/1999
Trigger for this review (name and date): First Five-Year Review March, 1994		
Recycling, reuse, redevelopment site (highlight): Y N		

Deficiencies:

No significant deficiencies were noted. See attached report Section VII: Deficiencies.

Recommendations:

Recommendations are listed in the attached report, Section VIII: Recommendations.

Protectiveness Statement(s):

The remedies at the Davie Landfill Site remain protective of human health and the environment, at present.

Signature of EPA Regional Administrator or Division Director, and Date

Wick A. Brown 16 JUN 68
nature Date

Richard D. Green, Director, Waste Management Division
Name and Title

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Exhibits:

- Exhibit 1: Certificate of Construction Completion
- Exhibit 2: Declaration of Landfill Closure

Davie Landfill
Davie, Broward County, Florida
Superfund Five-Year Review Report

I. Introduction and Purpose

General. The U.S. Army Corps of Engineers, Jacksonville District (USACE), on behalf of the U.S. Environmental Protection Agency, Region 4 (EPA), has conducted a five-year review of the remedial actions implemented at Davie Landfill Site (DLS) in Davie, Broward County, Florida. This report documents the results of that review. The purpose of five-year reviews is to determine whether the remedial actions at a site remain protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and recommendations to address them.

Authority. This review is required by statute. Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and Section 300.430 (f) (4) (ii) of the National Oil and Hazardous Substance Contingency Plan (NCP), require that periodic (no less than every five years) reviews be conducted for sites where hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure following the completion of all remedial actions.

This is the second five-year review for the DLS, which focuses on OU2. The first five-year review, signed March 1994, focused on OU1. The trigger for this statutory review is the five-year interval after the signing of the first review. All remedies for Operable Unit 01 (OU-1) and Operable Unit 02 (OU-2) have been completed; there are no on-going remedial actions at this site.

Local Repository. This review will be placed in the Site files and local repository for DLS. The Information repository is located at the Broward County Main Library, 100 South Andrews Avenue, Ft. Lauderdale, Florida 33301.

II. Site Background

The following text is borrowed in large part, with modifications and additions, from the EPA Record of Decision (ROD) (September 1985) and ROD abstract (August 1994), Remedial Design (RD) documents (April 95), Final Remedial Design Report (May 1988) Remedial Action (RA) Workplan documents (no date), Final Remedial Construction Report (December 1989), Remedial Investigation/Feasibility Study Work Plan (January 1993) and the Groundwater Monitoring Report (4/97 to 4/99).

A. Site Description

General. The DLS is a 210 acre inactive municipal landfill located at 4001 S.W. 142 Avenue in the town of Davie, approximately seven miles west of Ft. Lauderdale, Florida. The DLS is bordered to the north by a Boy Scout camp, the west and south by a dairy farm and to the east by residential development. The surrounding area is rural with mixed residential, commercial, agricultural and undeveloped land. A site location map is presented as Figure 1.

Physical Characteristics of the Landfill System. Two large landfill mounds dominate topography at the site. The North Mound (sanitary landfill) rises to approximately 80 feet above National Geodetic Vertical Datum. The South Mound (trash landfill) has an elevation of approximately 70 NGVD. The lowest elevations at DSL include a pond where the former sludge lagoon was located and three borrow pit lakes in the eastern and southern sections of DSL. The borrow pits were used as a source of limestone for landfill operations and cover material. The borrow pits are approximately 25 feet deep. A general layout map, which shows landfill system and topography features, is presented as Figure 2.

Surface Waters. DSL is located between two drainage canals. The North New River Canal (L-36) is approximately three and a half miles to the north and the South New River Canal (C-11) which is approximately one quarter mile to the south. To the east of the landfill is a north-south drainage ditch that drains into the C-11 canal. This shallow ditch lies east of Boy Scout Road and to date has received no surface water runoff from DLS. All surface water runoff is channeled to one of the borrow lakes. Lakes 1, 2 and the pond are physically connected. The northern area of the site drains to lake numbers 1 and 2 and the southern area drains to lake number 3. There is a perimeter berm around DLS that is designed to hold a 25 year, 72 hour storm event.

Hydrogeological Units. The hydrogeological units that are present in the vicinity of the DLS are the surficial or water table aquifer which is the Biscayne Aquifer and the artesian aquifer known as the Floridan aquifer. The Biscayne is an unconfined aquifer, which is approximately 100 feet thick at the site. The aquifer is EPA sole source designated because it is the only groundwater source of potable water in Broward County. The Biscayne Aquifer consists of two hydraulically connected units. The upper Biscayne aquifer is approximately 50 feet thick and consists of a series of interbedded sandy limestones, limestone and sandstone. Much of the upper aquifer was likely mined out to depths of 25 feet during borrow pit operations. The lower Biscayne aquifer consists of approximately 50 feet of sandstone that contains large solution holes which are at least partially filled with sand. The hydraulic conductivity of the upper unit is estimated at 300 gpd/ft. The hydraulic conductivity of the lower unit is estimated at

10,000 gpd/ft. Approximately 200 feet below the surface a confining sequence of clays and marls exists known as the Hawthorn Group which represents the regional upper confining unit for the Floridan aquifer. The Floridan Aquifer is not hydraulically connected to the Biscayne aquifer.

The Hydrogeology of the Biscayne Aquifer. Based on water level (WL) measurements taken in September and November, 1999 that were reviewed in the July -December 1999 Semi-Annual GW Report, the potentiometric surface elevation of the underlying Aquifer ranged from approximately 4 feet in the northwest portion of the landfill to approximately 2.3 feet in the southeast portion of the landfill, indicating a southeasterly GW flow direction (See Figure 3). This is also the flow direction reported in the ROD. The regional GW gradient is reported to be about 0.4 feet per mile. The C-11 canal has a direct effect on the GW flow in the DSL area. During mostly seasonal periods of high stage the canal becomes a recharge source for the aquifer and influences GW flow in a northerly GW flow direction. During periods of low flows the canal acts as a discharge area for GW and enhances the southerly flow direction of the site. Therefore, fluctuations in GW at DLS are directly related to precipitation and pumpage events in the area.

B. Site Chronology

The following text is borrowed in large part, with modifications and additions, from the EPA Record of Decision (ROD) documents and ROD abstracts (September 1985), the Remedial Design Report (May 1988), Remedial Action Workplan (RA), (no date), Final Remedial Construction Report (December 1989), Remedial Investigation/Feasibility Study Work Plan (January 1993) and the Groundwater Monitoring Report (4/97 to 4/99).

History of Disposal. The DLS also known as the Broward County Solid Waste Disposal facility is owned and operated by Broward County, Florida. The facility began operation in 1964 with a garbage incinerator and a trash landfill, which accepted trash, construction and demolition debris and ash from the incinerator. In November, 1971 the unlined lagoon was created in an onsite natural depression to receive grease trap pump outs, septic tank sludges and treated municipal sludges. In June 1975, the incinerator was closed because of excessive particulate emissions, and a sanitary landfill was opened just to the north of the existing trash landfill. The sanitary landfill received residential solid waste which included a mixture of garbage, rubbish, refuse and trash resulting from normal housekeeping activities. In 1975 the sludge lagoon was receiving an estimated 2,500 tons per month of waste. In 1977, dikes were constructed around the northern and eastern perimeters of the lagoon, which brought the height to an elevation of about 19 feet. By 1980 the volume received by the lagoon increased to an estimated 7,100 tons per month.

Concern over visible discharges to an adjacent borrow pit fueled the belief that discharges could be occurring to the adjacent trash landfill and to the local groundwater. As a result, in 1980 Broward County restricted the lagoon incoming waste to grease trap pump outs only. By 1981 groundwater contamination concerns led the county to cancel all disposal operations at the lagoon. In December, 1987 in accordance with an agreement with the Town of Davie the sanitary landfill was also closed. The entire DLS was officially closed on February 7, 1995 through the state of Florida's landfill closure program.

Enforcement and Compliance Activities. The first enforcement / compliance activity occurring on the DLS appears to be the shutdown of the incinerator in 1975 for excessive emissions. In November, 1981 the Environmental Protection Agency (EPA) designated the site as a Hazardous Waste Site under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), better known as Superfund, which impelled the County to cease all disposal activities at the Lagoon. In August 1982 the EPA initiated sampling of the lagoon. Sampling results indicated GW contamination and the DLS was subsequently placed on the NPL. Concern was raised over the relatively high cyanide and sulfide concentrations. Because the Resource Conservation and Recovery Act (RCRA) did not have definite criteria for hazardous waste classification established at the time -it was undetermined if the waste should be classified as hazardous by reactivity. Further sampling events in 1983 and 1985 showed reduced cyanide levels and the hazardous waste classification of the materials in the sludge lagoon was dropped. However, the listing of the DLS as an NPL site initiated cleanup actions.

On September 27, 1985 the EPA issued a Record of Decision for operable unit one (OU1) to cleanup the sludge lagoon area. As a result Broward County developed a closure plan for the sludge lagoon and the landfill. Because the plan was similar in nature to an RI/FS it was accepted as the RI/FS in October, 1987. The work was done in phases until the closure process was completed through the State of Florida's landfill closure program on February 7, 1995 (See Exhibit One). A "Certificate of Construction of a Solid Waste Management Facility" issued by the Florida Department of Environmental Protection (FDEP) shows that the work was completed with no deviations from the approval plans (See Exhibit Two).

In 1992, EPA and Broward County entered into an Administrative Order by Consent (AOC) for completion of a supplemental RI/FS. The RI was finalized in January, 1994 and the FS was finalized in April 1994. The RI's purpose was to determine if further CERCLA action was required at the site. The work included installing additional monitoring wells to characterize groundwater contamination and sampling soils, sediments and surface water to identify further sources of contamination. A Baseline Risk Assessment Report was also developed. In August, 1994 a ROD was issued for OU2 to present the selected remedial action.

Table 1: Chronology of site events.

Event	Date
Incinerator and landfill trash operations begin.	1964
Sludge Lagoon created and operations begin.	November, 1971
Broward County initiates water quality monitoring program.	1973
Incinerator shutdown and sanitary landfill operations begin.	June, 1975
Sludge Lagoon placed on EPA CERCLA Closure List.	1981
DSL Geophysical Investigation 1 completed.	1981
Sludge Lagoon placed on NPL.	September, 1983
EPA issues ROD to cleanup Sludge Lagoon. (OU1)	September, 1985
Broward County submits closure plan for landfill, which is accepted as RI/FS.	October, 1987
DSL closed.	December, 1987
Geophysical Investigation 2 completed.	May, 1988
Removal of source contamination -Sludge Lagoon. RA for OU1 completed.	May, 1989
RI/FS completed for (OU2).	January, 1994
ROD signed for (OU2)	August, 1994
Post Closure Permit issued by FDEP.	February, 1995
FDEP concurs with ROD. (OU2)	April, 1995
RA initiated for OU2.	October, 1995

III. Results of Site Investigations

A. General

OU1 Investigations:

A summary of the investigations leading to the ROD is provided in Section II.B of this report. The EPA's decision to issue the ROD came from groundwater concerns originating from the data of the EPA's sampling events from the 1970's to mid 1980's and a resistivity study (geophysical investigation) in 1981. Together the data indicated the presence of an on-site plume containing above background levels of total dissolved solids moving towards the southeast, which is the regional GW flow direction of the site. Broward County's involvement came early in the picture. They were preparing to do their own RI/FS until the EPA decided to direct the cleanup operations and issue the ROD. The EPA, Broward County and FDEP all concluded that this was a workable solution. The groundwater data collected for the ROD seems to have originated from 37 wells that were installed between 1974 and 1984. The 1985 OU1 ROD that was issued for the remediation of the sludge lagoon also stated requirements to address groundwater contamination after an evaluation of the cleanup effects and continuing GW monitoring. The remedial objectives and construction activities of the first ROD for OU1 were completed in 1989 and are addressed in the first EPA -DSL Five-Year review. The selected remedy stated in the ROD included the following components: dewatering and stabilizing the sludge lagoon contents, placing treated sludge lagoon contents in a lined sanitary landfill cell and installing an approved cover over the cell. The first DLS five-year review was brief and made no specific recommendations. However, the review stated the selected remedy for OU1 remained protective of human health and the environment at that time, and the remedy was cost effective.

OU2 Investigations:

OU2 investigations originated from the OU1 ROD requirements, which stated the need to identify if additional hotspots and further groundwater contamination existed at the site. Broward County completed a RI for OU2 in January, 1994 pursuant to EPA's 1992 Administrative Order of Consent. In addition to GW monitoring, surficial soils, surface water and sediments were sampled at DLS and surrounding areas during the investigation. The RI concluded that soils, sediments and surface water contained only minor concentrations of chemical contamination. However, groundwater contaminants at the site exceeded several State of Florida primary drinking water standards. Antimony and vinyl chloride were identified as the GW contaminants exceeding these standards, although there were not enough occurrences of either one to define a plume. So far there have been no additional Post-ROD investigations performed on DLS for OU2.

B. Contaminants of Potential Concern

The following constituents (see Table 6-1 of the ROD) were identified as contaminants of potential concern (COPC) for the OU2 ROD based on past sampling and analysis, and a baseline risk assessment:

Surficial Soil: antimony, arsenic, barium, cadmium, cooper, lead, manganese, mercury, nickel, silver, vanadium, zinc, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)floranthene, bis(2-ethylhexyl)phthalate, 1,4-Dichlorobenzene, alpha-Chlordane, gamma-Chlordane, 4,4'-DDE.

Groundwater: aluminum, antimony, arsenic, barium, beryllium, chromium (total), cobalt, cyanide, lead, manganese, thallium, Bis(2-Ethylhexyl)phthalate, 1,4-Dichlorobenzene, Isophorone, acetone, carbon disulfide, chloroform, vinyl chloride, 4,4'-DDD, 4,4'-DDT.

Sediment (Lake 1,2&Pond): aluminum, barium, beryllium, cadmium, chromium (total), cobalt, copper, lead, Manganese, Mercury, nickel, vanadium, zinc, benzo(b)fluroranthene, benzo(k)fluoranthene, bis(2-Ethylhexyl)phthalate.

Sediment (Lake 3): Chromium (total), mercury, nickel.

Sediment (Canals): Arsenic, chromium (total), cooper, lead, mercury, nickel, zinc, 1,4-Dichlorobenzene, 4,4'-DDE

C. Potential Pathways for Contaminant Migration

Potential pathways of exposure were identified in the ROD as follows: Release of leachate into the ground water; surface waters, sediments, and soils. The ROD determined that exposure to constituents by air transport was not considered to be significant at the site. The reasons given were; present landfill covers in place, operation of an active landfill gas recovery system and the minimal presence of VOCs in the contaminated media. A discussion of each exposure scenario that was evaluated in the ROD follows:

Groundwater Consumption. There is no known current consumption of GW from the Biscayne Aquifer in the vicinity of DLS. The current residents living by DLS were placed on the municipal water system and therefore were not considered as potential receptors in the ROD. However, a future scenario receptor situation was considered in the Risk Assessment.

Direct Contact/ Ingestion of Surface Water & Sediment. Based on the ROD, potential exposure scenarios are dermal contact with affected surface water and sediment and/or accidental ingestion by landfill workers and potential trespassers (youth).

Direct Contact/ Ingestion of Surface Soil. A potential exposure scenario for direct contact and /or ingestion of surface soils was taken into consideration due to the fact that adult workers are present and possible trespassers (youth) could be present on site.

D. Summary of Site Risks

Cancer slope factors (CSFS) associated with exposure to potentially carcinogenic chemicals through specific media have been calculated and reported in the ROD. The toxicity criteria used in the ROD to evaluate potential non-carcinogenic health effects through specific media are reference doses (RfDs). The RfD values have been calculated in the ROD. Both CSFS and RfDs values can be found in the ROD in tables 6-3 to 6-6. Hazard quotients (HQs) associated with exposure to a single non-carcinogenic contaminant in GW medium have been calculated and reported in the ROD in Table 6-7. A Hazard Index of 2 was generated for noncancer site risks due to the presence of antimony in GW for small children.

Groundwater Consumption. As mentioned, the ROD identified Receptors as workers, trespassers and a future scenario including area residents. In theory if any receptors use the water for a potable water source, the ROD states that the estimated potential added cancer risks for vinyl chloride and arsenic concentrations are outside EPA's acceptable range. Currently there is no known consumption of the Biscayne Aquifer GW, either within the boundary, or in the general vicinity of the DLS. The supply of public water to residences in the vicinity of DLS has further reduced risks associated with GW consumption.

Contact with Surface Soil. Based on the Risk Assessment performed by the EPA, the soils at DLS are not hazardous to the public. Therefore human health is not considered to be at risk. EPA is not restricting access to DLS, in fact the landfill has already been zoned for park and recreational use to the public.

Contact with or Consumption of Surface Water and Sediments. The effects of the contaminants of concern in surface water and sediments were evaluated in the Risk Assessment and were found to be below a level of concern. Therefore, human health is not considered to be at risk due to any possible contact with or consumption of surface water in the vicinity of DLS.

Hypothetical Future Cumulative Risks. The EPA evaluated the future resident scenario, evaluating the worst possible exposure risk to each contaminated media- GW, SW, soils and sediment. The risk assessment concluded that the surface soil, surface water and sediment at DLS do not pose a significant risk to future residents. However the possibility of future residents with private wells tapping into the contaminated GW after downgradient spreading, drives the scenario to a significant risk. The county contends that the site is zoned for parks and recreation - not a residential area and that public

water will be supplied for all park facilities. The EPA contends that residential areas exist in the area and therefore the future risk evaluation criteria were applied.

IV. Summary of Response Actions

A. Remedial Objectives

The objectives of remedial action, as stated in the OU2 ROD, were to provide for the remediation of potential GW threats to the environment. No additional hotspots were discovered during the RI/FS. In addition, any contamination found was at low levels. The OU1 ROD-RA completed in 1989 had already established the objective of reducing the potential for future regional migration of GW constituents associated with the landfill. According to the EPA the completion of the landfill closure in 1995 under the FDEP permit eliminated the only remaining source of contamination in the groundwater, surface soils, surface water and sediments.

B. Remedy Selection

The ROD was issued on August 11, 1994. This was the second and final ROD which addressed GW contamination at the DLS. The selected remedy for OU2 as paraphrased from the ROD, includes the following components: (1) natural attenuation of vinyl chloride and antimony, (2) ground water monitoring to confirm natural attenuation, (3) monitoring of residential wells to determine the impact upon such private wells, (4) public water supply connections for residents that have been affected by contamination in excess of the levels above performance standards.

C. Remedy Implementation

Based on the OU2 ROD, a Unilateral Administrative Order (UAO) was issued to Broward County on October 5, 1994 directing Broward County to perform the Remedial Design and Remedial Action (RD/RA) described in the ROD. The county in accordance with the UAO, submitted a Remedial Design report. The EPA approved the Final RD report in September, 1995.

Implementation of the four components of the selected remedy for OU2 was separated in the RD report by the execution of separate plans. The report contained (1) the Sampling and Analysis plan, (2) the Health and Safety plan, (3) The Water Quality Monitoring Plan, (4) the Residential Well Monitoring Plan, (5) The Public Water Supply Extension Plan. Because this execution did not require any major construction activities for the remedial design or the remedial action, the EPA determined that a remedial action report was not necessary. On October 18, 1995 the EPA acknowledged that the requirements of the ROD had been fulfilled and that the remedial action at the site was both operational and functional. The EPA completed a preliminary closeout report for DLS in November, 1995.

D. Operation and Maintenance

The operation and maintenance period effectively started with declaration of landfill closure issued by the FDEP on February 7, 1995. Under the terms of the landfill closure permit the O&M period is 20 years, to be concluded in July of 2015. Five years or 20 operating quarters have already elapsed in the O&M period. At the time of the writing of this report, the twentieth operating quarter (January to March 2000) is in effect. As required by the UAO, Broward County submits quarterly and annual summary status reports. The purpose of the reports is to inform the EPA on work accomplished and work remaining to be accomplished at the DLS along with schedules. The last report was submitted in December, 1999 and contained information for the quarter (October-December, 1999).

Routine O&M. The following are components of routine O&M activities for the DLS: site inspections, closure cover maintenance, storm water system maintenance, surface water management system maintenance, leachate collection system maintenance, GW monitoring system maintenance, gas recovery system maintenance, GW monitoring and gas monitoring. Leachate line pressure monitoring and biannual analysis of the leachate is also performed. A discussion of each of these activities follows.

Site inspections are performed daily at the DLS. For the past five years site inspection results and maintenance activity reports have been submitted by Broward County to EPA in Quarterly Status Reports. Based on interviews with Broward County Solid Waste Operations Division Engineer, Mr. Ram Tewari and a review of available documentation these requirements are being performed satisfactorily.

Closure cover maintenance requirements include: mowing the vegetative cover, fertilizing and reseeding as needed. Inspection of landfill side slopes for leachate seepage, cracks, erosion, settlement and repair as necessary. Based on interviews with Broward County engineer, Mr. Ram Tewari, the 5-year review site inspection, and review of available documentation, these requirements are being performed satisfactorily.

In general, surface water management system maintenance requirements include the following on an as-needed basis: removal of debris and silt from the various components of the drainage system (eg. ditches, culverts, weirs etc.), repair of erosion or damage in rip-rap areas. Based on interviews with the site engineer Mr. Ram Tewari, observations during the 5-year review site inspection, and review of available documentation, these requirements are being performed satisfactorily.

Groundwater monitoring system maintenance requirements consist of inspection of the monitoring wells each time samples are collected, and repair as needed. Based on interviews with Mr. Ram Tewari of Broward County and observations during the 5-year review site inspection, and review of available documentation, these requirements are being performed satisfactorily.

The North Mound leachate line is monitored at least twice a week for any unexplainable pressure drops. Based on interviews with the site engineer Mr. Ram Tewari, observations during the 5-year review site inspection, and review of available documentation, these requirements are being performed satisfactorily.

Landfill Gas Recovery System (LGRS) maintenance requirements consist of monthly inspection of 38 gas recovery wells on the sanitary landfill for damaged pipes, fittings, flexhoses, clamps and valves each time gas measurements are obtained, and repair of damaged units within 60 days of discovery of the malfunctioning unit as stated in the O&M plan and as required under the Florida Administrative Code (F.A.C.) Rule 62-701.620(7). The gas recovery flare is also inspected during the monthly visits. Broward County has contracted all work associated with LGRS O&M (including monitoring) to EMCON/OWT. Based on interviews with Mr. Ram Tewari of Broward County, observations during the 5-year review site inspection, and review of available documentation, these requirements are being performed satisfactorily.

Routine Monitoring and Laboratory Testing.

Routine GW Monitoring. In general, routine GW monitoring requirements consist of GW sampling and analysis on a biannual basis. Broward County conducts the GW sampling events during the months of April and October of each year. The OU2 ROD and the FDEP landfill closure directives require that seven monitoring well clusters, numbers 3,7,8,9,11,21,and 22 are to be sampled biannually. The GW well clusters each consist of three to four MW's at different depths. All wells in the clusters are sampled for total metals and volatile organic compounds. GW well cluster 22 serves as the background well for DLS monitoring. GW well clusters 11 and 21 are the downgradient compliance wells. According to the ROD, the removal of the site from NPL status occurs when attainment of cleanup goals is reached for one year of GW sampling. The sampling data must not exceed the cleanup standard for Vinyl Chloride and Antimony. Based on review of GW data from 1997 to 1999 and based on interviews with the EPA case manager Mr. Bill Denman, GW monitoring has been conducted during the last five years in accordance with the requirements and schedule laid out in the O&M plan and Groundwater Monitoring Plan. Based on this GW data, DSL is moving closer to being deleted from the NPL list. A review of GW data results associated with O&M routine sampling is given in Paragraph "E" of Section V of this report.

Routine Leachate Analysis. The landfill closure permit directives require that Broward County conduct a biannual leachate analysis. The leachate collection system from the sanitary landfill drains into a main sump where it is pumped through the DLS leachate line, to the Davie sewer main and into the Sunrise Regional Wastewater Treatment Plant where it receives secondary treatment. The samples are drawn from the main sump. Although Broward County is required to analyze the leachate samples, they are not required under any ROD or landfill closure directives to attain any specific cleanup criteria targets for leachate. A record of monthly leachate volume is kept on site. See Attachment D for 1999 yearly leachate and rainfall amounts.

Routine gas monitoring requirements. The DLS landfill gas recovery system is operated according to Title V, FDEP Permit no: 0112399-001-AV. The requirements consist of monthly monitoring/recording of gas pressure, gas composition, and oxygen concentration and gas temperature at each gas extraction well. Methane concentration at the DLS surface is monitored quarterly. In addition the sanitary landfill is inspected for evidence of gas seepage such as stressed vegetation, cracks in the surface layer and unusual odors. A review of available 1999 records indicate that the gas monitoring system is operating within the permit requirements with no exceedances, and is functioning as designed.

Surface Water Discharge. SW monitoring requirements consist of collecting surface water samples at the DLS sampling point in the mid-eastern section of the site. The landfill closure permit require that Broward County sample the surface water at this point during periods of stormwater discharge from the site and submit the results concurrently with the GW monitoring reports. The DLS SW system uses the storage capacity from the three lakes and pond as well as a perimeter berm to prevent water from flowing offsite. No overflow will occur until the 72- hour storm stage is exceeded. To date no surface water flow event has occurred in which DLS discharged water off site. The SW retention capabilities of DLS are well designed and there has been no event to date that would require SW sampling. Therefore, a review of the GW monitoring reports does not include SW data. If a stormwater event exceeds the retention capacity of the lakes and berm then a controlled release will take place into a 36-inch diameter underground culvert, which drains into the ditch adjacent to Boy Scout Road. From there the water would flow into the C-11 Canal.

O&M Cost Data. Broward County estimates that the costs associated with the landfill closure in accordance with the FDEP permit is over \$14 million. This includes costs for the twenty-year long-term monitoring and O&M at approximately \$250 thousand per year. O&M cost data are provided in Table 3.

V. Summary of Site Visit and Findings

A. General

This five-year review consisted of the following activities: a review of relevant documents (see Attachment A, Documents Reviewed); interviews with the EPA Project Manager and DLS engineer, a site inspection, and preparation of the five year review report. The completed report will be placed in the local repository. Notice of its completion will be placed in the local newspaper, and local contacts will be notified by letter.

B. Interviews

EPA Region IV Remedial Project Manager, Mr. William Denmen. Mr. Denman was interviewed on several occasions: during the May 1999 USACE visit to EPA Region IV office, and during several subsequent phone conversations. Mr. Denman provided background information on the DLS, a history of site activities, and information on ongoing site activities. Mr. Denman provided documentation, which was reviewed, for this report. Much of what was learned from Mr. Denman is included in this report.

Broward County Public Works Department, Engineer and Site Manager Mr. Ram Tewari. Mr. Tewari was interviewed on several occasions: during the March 20, 2000 site visit, and during several subsequent phone conversations. During the site inspection, Mr. Tewari guided the tour of the landfill, providing commentary on features of the landfill system, sampling activities, and other background information. Much of what was learned from Mr. Tewari was included in this report including O&M operations and procedures at DLS.

Florida Department of Environmental Protection, Hydrogeologist Mr. Jim Harmon. Mr. Harmon was interviewed during several phone conversations during February and March and provided information on site history and the FDEP's role in the landfill closure process as well as relevant GW background information.

C. Site Inspection

General. The five-year review site inspection for the DLS was held on March 20, 2000. The weather was warm and humid, with partly cloudy skies. Due to heavy rains occurring the previous day there was some localized ponding of water on some flat areas in the DLS.

The following individuals were in attendance:

1. Teri Long, FDEP, Southeast District, Engineer, Air Permits Branch
2. Glenn Olshefski, USACC, Fort Dix RDPW, Environmental Scientist
3. Ed Villano, USACE, Jacksonville District, Environmental Engineer
4. Greg Mellema, USACE, Omaha District, Environmental Engineer
5. Mary Beth Busutil, Director, Broward County Solid Waste Operations Division
6. Ram Tewari, Broward County Solid Waste Operations Division, Engineer
7. Harvey Schneider, Broward County DPEP, Hydrogeologist
8. Gerald Peters, Broward County Solid Waste Operations Division, O&M Manager

During the site inspection, the following features were inspected or observed: perimeter fence, landfill covers, site drainage, three retention lakes, nature pond, weir spillway, drainage culverts, perimeter berm, monitoring wells, landfill gas recovery wells, flare system, main leachate sump station and general site conditions.

Cover System. In general, both the sanitary and trash landfill caps are in good condition. The cover system for both caps consists of a two-foot thick limerock cover which is compacted in six inch layers with six inches of vegetative cover soil. Slopes on the cover are relatively flat on the crown of the landfill cells, with slopes generally 1 to 3%, with some areas that do not readily drain due to settlement. There were no signs of erosion and the vegetation was in good condition. There were no obstructions present on the cover system that would impede sheet flow off the cover into the drainage system. There were no areas of slides or sloughs, some minor settlement was noted on the north mound. It was mentioned that the landfills have settled uniformly approximately five feet since 1987 and there are no permanent settlement monuments on either of the mounds.

Landfill Gas Control System. Several gas extraction wells were observed on the North Mound of the DLS. Some settlement has occurred in the area but appears to have not impacted the condition and operating efficiency of the wells. Presently, this is a long term impact situation that Broward County is aware of and continues to monitor. The Active Gas Flare System was observed to be locked and secure. The DLS gas collection system appears to be functioning adequately at this time. The Flare is currently run on a timer where it burns off landfill gas for six hours on and six hours off. Adjustments to the system can be made as needed, depending on the quantity and quality of landfill gases.

Site Drainage Features. Surface water runoff collects in a series of three lakes, the pond and retention perimeter berms. Lake numbers 1, 2, and 3 all appear to be in good condition. The former sludge lagoon as noted in the first five-year review is still a thriving nature pond. The spillway channel from Lake 2 to Lake 3 was free of obstructions and appeared to be working as designed. The berms appeared to be in good condition. The sand trap was clean and in good condition. The site drainage culvert leading to the offsite ditch was also clean, free of debris and in good condition. Several Bass fish were observed in lakes 1 and 2.

Monitoring Wells. The monitoring wells observed appeared to be well identified and in good condition. The locks were also in good shape. MW cluster #11 is located on a sand rim and showed signs of settlement including cracked concrete around the base of the wells. Presently this does not affect the structure and integrity of the wells. However it should be monitored for any long-term change in condition.

Site Security. Perimeter fencing appears to be adequate, with no damage noted. There was no damage due to vandalism noted during the site visit. Broward County has in the past and continues to repair sections of the fence and sign removals due to vandalism.

Other. The roads and curbs all appeared to be in good condition. The site appeared to be neat and orderly.

D. Review of Applicable or Relevant and Appropriate Requirements (ARARs)

An ARAR review was performed for the site in accordance with the draft EPA guidance document, "Comprehensive Five-Year Review Guidance," EPA 540R-98-050, April 1999.

Documents reviewed for the ARAR analysis:

1. Five Year Review Report (first), January 1994
2. Record of Decision, August 1994
3. Groundwater Monitoring Report, July-December 1999.

ARARs Identified in the OU1 ROD.

In summary, the EPA, 1994 DLS Five Year Review, listed ARARS exactly as follows from the September 1985 ROD for OU1.

<u>Requirement</u>	<u>Substance</u>
1. Chapter 17-7 FAC (1985)	Resource Recovery and Management
2. Solid Waste Disposal Act	Landfill closure
3. Resource Conservation and Recovery Act	Hazardous Landfill Closure
4. Clean Water Act	Water Quality
5. Safe Drinking water Act	Drinking Water Quality
6. Clean Air Act	Air Emissions Control
7. National Oil and Hazardous Substances Pollution Contingency Plan (NCP)	Remedy Evaluation/Selection

The review concluded that since the ROD, no identifiable changes in standards had occurred, that would challenge the protectiveness of the remedy selected.

ARARs Identified in the OU2 ROD Requiring Review.

1. National Primary Drinking Water Standards 40 CFR Part 141
2. Maximum Contaminant Level Goals Publication L. N 99-399, 100 Stat. 642(1986)
3. Ambient Water Quality Criteria 40 CFR Part 131
4. RCRA Groundwater Protection 40 CFR Part 264
5. Florida Drinking Water Standards FAC 17-550
6. Florida Groundwater Regulations FAC 17-520, 7-522
7. FDEP Air Pollution Control Regulations FAC Chapter 17-2

Groundwater Related ARAR Review: The ROD identifies the RCRA GW Compliance Monitoring Program codified at 40 CFR Part 264. GW monitoring has and is being conducted in accordance to the GW ARAR for the site.

During the RD process, a groundwater-monitoring program was developed and approved by EPA, that includes a specific list of parameters for analysis for the DLS. Exceedances of GW MCLs for the DLS are discussed in Paragraph "E" below.

Air Pollution Control Related ARAR Review: The DLS landfill gas recovery system and flare is operated according to a Title V Permit under FDEP. The DLS is operating within permit requirements and in accordance to the Air Pollution Control ARAR for the site.

ARARS not Identified in the OU2 ROD Requiring Review.

1. Florida Solid Waste Landfill Closure Requirements of the Florida Administrative Code (FAC) 17-701.070

Florida Solid Waste Landfill Cover Related ARAR review: The major requirements of Florida State solid waste landfill closure regulations have not significantly changed since the OU1 ROD was signed in 1985. It is not anticipated that any changes to the old standards not being attained by the current landfill cover would adversely impact the overall protectiveness of the remedy. Per the five-year review team project engineers, the current DLS landfill cover is in good condition and is still adequately controlling surface runoff, and migration of contaminants.

General ARAR Related Protectiveness Summary: It appears from the site history that the majority of ARARS cited for this site were addressed under the RCRA landfill closure requirements and post closure permit issued by the FDEP as part of the Administrative Order. Although groundwater MCLs have been exceeded at several locations at the DLS, there does not appear to be an immediate threat to the protectiveness of the remedy. Groundwater usage restrictions and supply of potable water to area residents have addressed the risks associated with the groundwater ingestion pathway.

E. Groundwater Data Review

The first biannual GW sampling at DLS by Broward County since the completion of the OU2 Remedial Design was in October, 1995. In accordance with the UAO and FDEP closure activities, there have been ten GW rounds of sampling completed thus far. Results of the last four biannual sampling events for the contaminants of concern were reviewed for this section and are shown in Table 2. Antimony was not detected above the MCL during the period. However, vinyl chloride has slightly exceeded the MCL at scattered sampling events at MW's 11-57, 11-100, 21-62 and 21-85. As a result DLS still remains on the NPL list and needs at least a year of groundwater data with MCLs

below the state drinking water standards to be considered for removal. See Attachment B for GW Summary Data.

VI. Assessment

The following conclusions support the determination that the remedy at the DLS currently remains protective of human health and the environment:

Effectiveness of Remedy: As noted above, both landfill cover systems are in good condition. There is adequate vegetative cover, with no signs of erosion. The landfill gas recovery system appears to be functioning adequately at this time. The site drainage system is functioning properly and to date no SW has been discharged off site. Monitoring wells are in good condition and functioning adequately. Perimeter fencing appears to be adequate. As noted during the inspection, Broward County appears to have performed DLS-O&M requirements exceptionally well and will soon be entering into the public park phase. The selected remedy remains protective of human health and the environment for the DLS. These conditions appear to indicate that the remedial actions continue to be effective. However, GW monitoring results showing slight exceedances of vinyl chloride above drinking water standards indicate that GW still needs to be monitored to demonstrate that natural attenuation is occurring at DLS. The contaminant levels do not appear to pose an immediate threat to human health and the environment at this time. In December, 1999 the FDEP recommended to Broward County that additional offsite downgradient monitoring well clusters should be added to the biannual GW monitoring plan to ensure that natural attenuation is effective. Broward County states that they currently awaiting a specific proposal from FDEP regarding this.

Adequacy of O&M: O&M procedures are consistent with requirements. No significant difficulties have occurred to date.

Early Indicators of Potential Remedy Failure: No early indicators of potential remedy failure were noted during the review. O&M costs and maintenance activities have been consistent with expectations.

VII. Deficiencies

No significant deficiencies were noted that pose a threat to human health or the environment at this time.

A. While not required under the ROD, UAO or FDEP closure permit - GW contour maps are not included in the GW semiannual reports. It may be useful in the future to include the maps to better understand the GW flow patterns at various depths of the aquifer and to determine if any GW flow anomalies not noted in the past exist.

B. Some settlement has occurred in the area, although this is not a short term problem, if not monitored properly it could develop into a long term one (IE. damage to Gas Recovery Wells, Leachate Lines, Monitoring Wells).

VIII. Recommendations

The following recommendations are made to address the deficiencies noted above as well as other ones related to DLS.

A. In future Semiannual GW monitoring reports include GW contour maps based on water level measurements taken while in the field. Also include GW flow directions.

B. Continue to monitor for any settlement changes (i.e. berms and landfill covers) and make adjustments or repairs as necessary in order to compensate.

C. The EPA Superfund fact sheet listed an additional repository at the South Regional BCC Library 7300 Pines Blvd, Pembroke Pines, FL 33024. However, no EPA DLS documents were found in the library. Therefore, the library should either be taken off the list as a repository for DLS or the documents should be placed there. The other repository located at the Broward County Main Library had complete EPA documentation available for reviewing.

IX. Protectiveness Statement

Presently the remedies at the Davie Landfill Site remain protective of human health and the environment. In summary:

- The landfill caps appear to be effective at containing contaminants through limiting infiltration of rainwater and preventing direct contact with contaminated soils.
- The gas recovery and flaring system is operating as intended.
- The 3 retention lakes, weirs and perimeter berm remain effective in routing and retaining surface runoff.
- Exceedances of GW MCLs on and offsite the DLS do not appear to pose any immediate threat to human health or the environment.

X. Next Review

This is a statutory site that requires ongoing five-year reviews. EPA should conduct the next review within five years of the due date of the second five-year review report, which is listed on the signature cover of this report.

Figures

Note: These figures were taken from the following documents:

Figure 1: Site Location Map, from: DLS Five Year Review. (January, 1994)

Figure 2: General Topography with MW Clusters, from: RUFS Work Plan, Camp Dresser & McKee Inc. (January, 1994) note: GW Monitoring Cluster 22 was drawn in by hand.

Figure 3: General Groundwater Movement of Site, From Final Report Broward County Landfill, Camp Dresser & McKee Inc. (January, 1983)

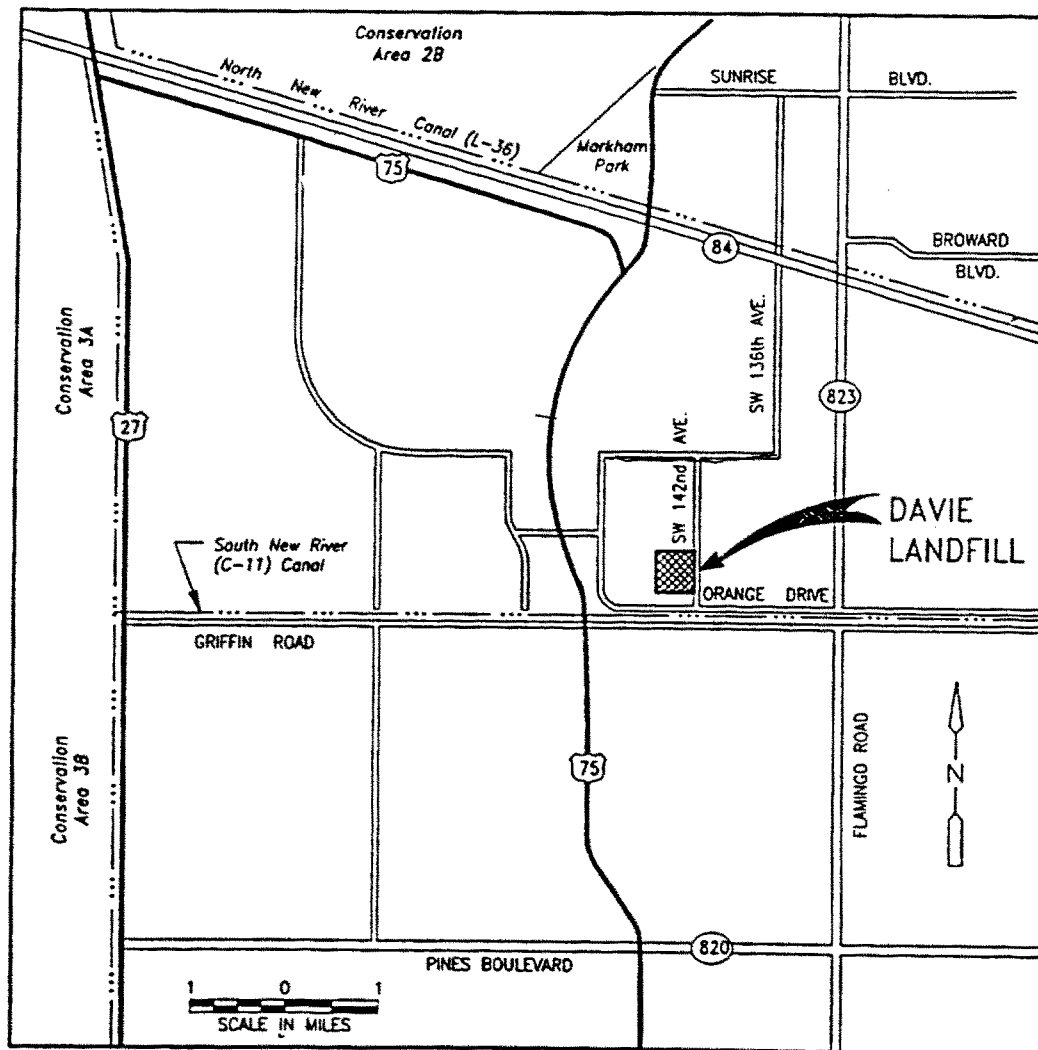
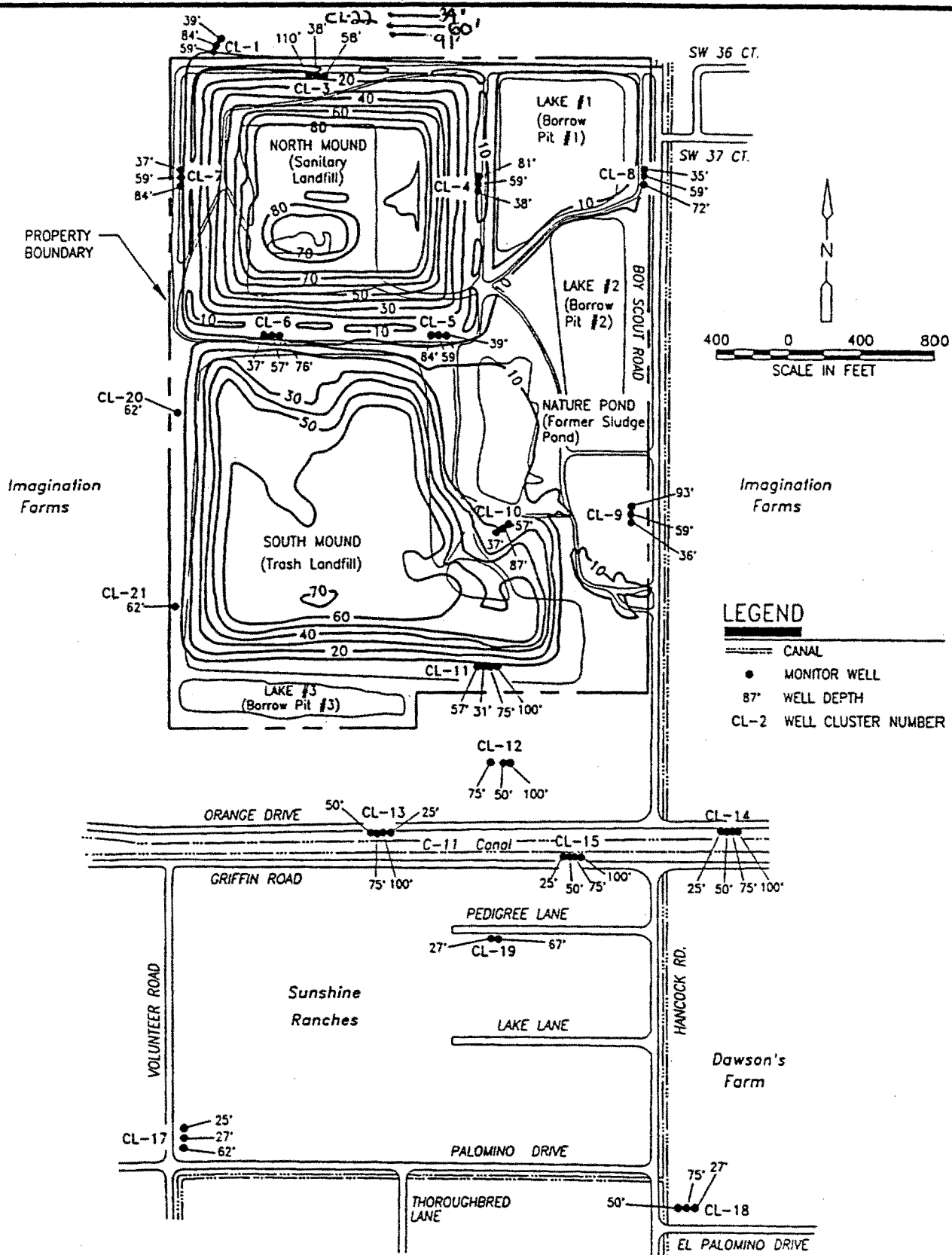


Figure 1. Site Location Map



GENERAL TOPOGRAPHY
BROWARD COUNTY LANDFILL
DAVIE, FLORIDA

FIGURE 2

SOURCE: PBS & J

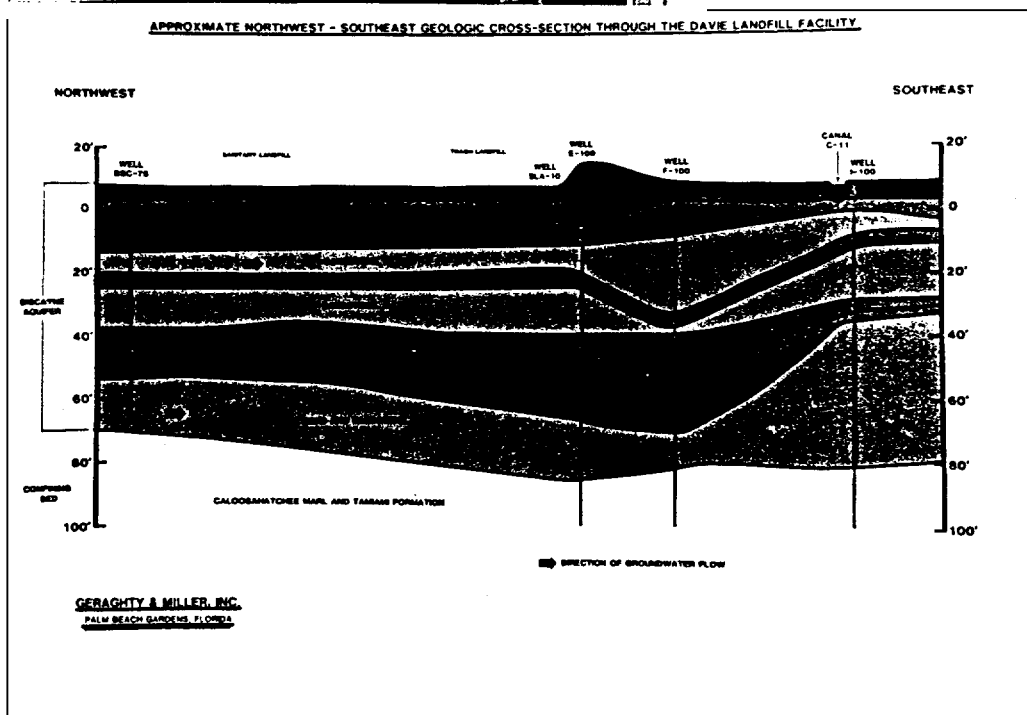
FIGURE 2

CDM

Broward County Landfill



Plan view illustrates the general groundwater movement on the site. The geological cross-section shows the various aquifers which groundwater moves at the 20, 50 and 60 foot depths.



HAZEN AND SAWYER, P.C.

FIGURE 3

DLS GW DATA SUMMARY: APRIL 1998 -SEPTEMBER 1999

Units = ug/L

MW-3 Cluster	APR 98	OCT 98	APR 99	SEP 99
MW-3-38				
Vinyl Chloride	<1	<1	<1	<1
Antimony	5.1	<6	<6	<6
MW-3-58				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-3-110				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6

MW-7 Cluster	APR 98	OCT 98	APR 99	SEP 99
MW-7-37				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-7-59				
Vinyl Chloride	< 1	< 1	< 1	< 1
Antimony	5.7	<6	<6	<6
MW-7-84				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6

MW-8 Cluster	APR 98	OCT 98	APR 99	SEP 99
MW-8-35				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-8-59				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-8-72-				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<7	<6

MW-9 Cluster	APR 98	OCT 98	APR 99	SEP 99
MW-9-36				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-9-59				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-9-93				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6

TABLE 2

DLS GW DATA SUMMARY: CONT.

MW-11 Cluster	APR 98	OCT 98	APR 99	SEP 99
MW-11-31				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-11-57				
Vinyl Chloride	<1	<1	<1	1.1
Antimony	<5	<6	<6	<6
MW-11-75				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-11-100				
Vinyl Chloride	<1	<1	1.5	2.6
Antimony	<5 I	<6 J	<6	<6 -

MW-21 Cluster	APR 98	OCT 98	APR 98	SEP 99
MW-21-35				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-21-62				
Vinyl Chloride	<1	<1	1.8	1.2
Antimony	<5	<6	<6	<6
MW-21-85				
Vinyl Chloride	<1	<1	<1	1
Antimony	<5	<6	<6	<6

MW-22-Cluster	APR 98	OCT 98	APR 98	SEP 99
MW-22-34				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-22-60				
Vinyl Chloride	<1	<1	<1	<1
Antimony	<5	<6	<6	<6
MW-22-91				
Vinyl Chloride	<1	<1	<1	<1
Antimony	5.1	<6	<6	<6

Performance Standards

GW will be monitored until the following maximum concentrations levels are attained.

<u>Contaminant</u>	<u>Concentration</u>
Vinyl chloride	1 ug/L
Antimony	6 ug/L

TABLE 2

Cost Estimates for Post-Closure Long Term Care (16 Years)
Broward County Landfill Facility at Davie ID #SO 06C06070, Permit #SF 06-227119

ACTIVITY/SYSTEM	1999
ADMINISTRATION, SITE INSPECTIONS AND CERTIFICATIONS (Weekly, Quarterly, Annual) <ul style="list-style-type: none"> • Reports preparation/submission • Surveys, supervision, recordkeeping, coordination, etc. 	\$ 15,000
FINAL COVER SYSTEM <ul style="list-style-type: none"> • Mowing, suitable fill, top soil, sod 	55000
DRAINAGE, SWALES, SAND FILTER, SURFACE WATER MANAGEMENT SYSTEM	12000
LANDSCAPING AND VEGETATION MAINTENANCE <ul style="list-style-type: none"> • Weeds removal, mulch, trimming, vines removal 	30000
LEACHATE MANAGEMENT SYSTEM	
• Leachate treatment and disposal	38000
• System lift stations and transmission	12000
• Electricity	7000
GAS MANAGEMENT SYSTEM	
• Maintenance (well field and flare system)	15000
• Replacement	10000
• Electricity	3000
ENVIRONMENTAL MONITORING SYSTEM	
• Groundwater (semi-annual)	20000
• Landfill Gas (monthly)	13000
• Leachate (semi-annual)	3000
• Storm Water (during overflow)	1,000
MISCELLANEOUS AND CONTINGENCY FUND <ul style="list-style-type: none"> • Institutional controls and maintenance - lights, access roads, fence, signs, locks, supplies, etc. 	16000
TOTAL	\$250,000

Attachment A

Documents Reviewed

Remedial Action Workplan Documents (no date)

Record of Decision, ROD Documents and Abstracts, Davie Landfill Site, Broward County, Florida, EPA, (September 1983 and August 1994)

Final report & Geophysical Survey, Ebasco Services Inc.,(May 1988)

Final Remedial Design Report, Post, Buckley, Schuh & Jernigan Inc. (May 1988)

Final Remedial Construction Report, Post, Buckley, Schuh & Jernigan Inc. (December 1989)

Remedial Investigation /Feasibility Study Workplan, Camp, Dresser & McKee Inc. (January, 1993)

Five Year Review Report, EPA, (March 1994)

Groundwater Monitoring Report, O&M Sampling Event, Savannah Laboratories, (July-December, 1999)

Attachment B

Vinyl Chloride Trend

VINYL CHLORIDE TREND

Jan. 1991-Sept. 1999

Storet Code:39175

MCL:1 ug/l

U.M.:ug/l

Well no.	Sampling date																									
	Jan. 91	Aril 91	Jul 91	Oct 91	Jan. 92	April 92	July 92	Oct 92	Jan. 93	July 93	Oct 93	Jan. 94	April 94	July 94	Sept. 94	May 95	Oct 95	April 96	Oct 96	April 97	Sept 97	April 98	Oct 98	April 99	Sept 99	
11-31	1.2	<1	<1	<1	<1	<1	<1	<1	<1	N.I.	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
11-57	1.2	3.6	3.9	<1	<1	<1	2.8	<1	<1	N.I.	<05	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
11-75	1.6	2.0	0.9	<1	<1	<1	<1	<1	<1	N.I.	<05	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
11-100	1.3	2.3	3.0	<1	<1	<1-	4.1	<1	<1	N.I.	<0.5	<0.5	<0.5	<0.5	<0.5	<1	1.3	<1	2.4	2.1	<1	<1	<1	1.5	<1	
21-35																	<1	<1	<1	<1	<1	<1	<1	<1	<1	
21-62	<1	<1	<1	<1	<1	<1	<1	<1	<1	N.I.	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	1.8	<1	
21-85																	<1	<1	1.1	<1	1.1	<1	<1	<1	<1	

GWD9498/11 &21 VinylChl/C.I.D./11.17.99
E-mail:(VCLD1121/C.I.D./11.17.99)

Performance Standards

Ground water will be monitored until the following maximum concentration levels are attained.

<u>Contaminant</u>	<u>Concentration</u>
vinyl chloride	1 ug/L
antimony	6 ug/L

Attachment C

Summary Of Ground Water Test Results (above MCLs)

Broward County
Public Works Department
Office of Integrated Waste Management
Solid Waste Operations Division
S.W. Broward County Sanitary Landfill (Davie)

Cluster # 3

Ground Water Test Results

Above Drinking Water Standard

Well No.	Storet Code	Parameter	U.M.	Sampling date													
				Jan. 94	April 94	July 94	Sept. 94	May 95	Oct. 95	Apr. 96	Oct. 96	Apr. 97	Sept. 97	Apr. 98	Oct. 98	April 99	Sept. 99
Test Results																	
3-38	515	TDS	mg/l	976		1036	821	930	670	690	Not	820	780	850	600	910	720
	76	Turbidity	NTU	1.4	6	2.6	4.1	8.1	2.2	2.4	Information		5.2	10	3.6	<1	<1
	1045	Iron	ug/l	4830	2460	421	4480	2900	4100	10000	—	2700	4800	4700	<50	4700	4700
	31503	Tot. Coli	coli/100 ml						700	1300		2200		1000	<10	23	<1
	82035	Sodium	ug/l							290000	—				<500	1300000	77000
	34030	Benzene	ug/l	1.1											<1	<1	<1
	400	pH		6.44											6.53	6.59	6.61

3-58	515	TDS	mg/l	916	621	894	948	910	700	0.87	810	820	740	700	680	920	740
	76	Turbidity	NTU	2.9	3.3	6.6	2.9	8.4	2.3	2.4	4		5.3	5.3	1.6	2.1	1.1
	1045	Iron	ug/l	5330	6370	4180	4450	3900	3700	3300	3200	3500	3800	4100	<50	4600	3900
	31503	Tot. Coli	coli/100 ml						98	1100	1600	1900	2	270	60	10	1
	31616	Fecal Coli	Col/100 ml					24									
	34030	Benzene	ug/l	4.3				1.1							<1	<1	<1
	940	Chloride	mg/l		265												

3-110	515	TDS	mg/l	621	672	657	642	690	610	610	670	630	640	630	580	740	750
	76	Turbidity	NTU	4.7	1.7	4.3	4.3	5.5	1.6	1.8	4.5		7.2	8.5	2.5	<1	1.14
	1045	Iron	ug/l	2320	6450	929	1510	1500	1300	1500	870	910	1200	1400	<50	1400	1000
	31503	Tot. Coli	coli/100 ml						560	2900	1360	3300		8000	<10	<1	<1
	31616	Fecal Coli	coli/100 ml					42									
	940	Chloride	mg/l		304												
	82035	Sodium	ug/l									170000			<500	150000	150000

GWD9499/C.I.D./11.18.99

**Broward County
Public Works Department
Office of Integrated Waste Management
Solid Waste Operations Division
S.W. Broward County Sanitary Landfill (Davie)**

Cluster # 7

Ground-Water-Test-Results

Above Drinking Water Standard

Well No.	Storet code	Parameter	U.M.	Sampling date													
				Jan. 94	April 94	July 94	Sept. 94	May 95	Oct. 95	Apr. 96	Oct. 96	A pr. 97	Sept. 97	A pr. 98	Oct. 98	Apr. 99	Sept. 99

Test Results

7-37	515	TDS	mg/l	793	546	797	847	920	770	810	830	860	800	720	710	770	610
	76	Turbidity	NTU	6.3	13.5	6.7	3.4	13			58		4.8	7.4	15	<1	<1
	1045	Iron	ug/l	4940	9220	6420	4450	4900	3000	4000	5100	3100	4000	7000	<50	4400	3600
	31503	Tot. Coli	coil/100 ml						320	2600	520	3100	8000	5200	140	4	<1
	34030	Benzene	ug/l	1.7											<1	<1	<1
	31616	Fecal Coli	col/100 ml				8										

7-59	515	TDS	mg/l	825	626	888	883	830		690	800	730	760	700	680	520	700
	76	Turbidity	NTU	10.2	6.3	10.9	3.6	9		1.1	8.1		6.1	6.4	6	<1	1.1
	1045	Iron	ug/l	7860	12000	7040	5640	11000	5570	6200	3500	3400	4600	6800	<50	5000	3800
	31503	Tot. Coli	coli/100 ml							8000		1600	200		<10	<1	3
	34030	Benzene	ug/l	2.1											<1	<1	<1

7-84	515	TDS	mg/l			533	540	520	520		540	510	530	480	540	680	560
	76	Turbidity	NTU	5.3	4.3	6.5	4.9	6.7			8.3		7.6	8.6	1.5	<1	<1
	1045	Iron	ug/l	5330	4630	3590	3280	5200	2700	3100	3400	3300	2900	4000	<50	6200	3500
	31503	Tot. Coli	coli/100 ml						8000		1600	3900	1300	5900	200	<1	3
	31616	Fecal Coli	col/100 ml				5										

Broward County
Public Works Department
Office of Integrated Waste Management Solid Waste Operations Division
S.W. Broward County Sanitary Landfill (Davle)

Cluster # 8

Ground Water Test Results

Above Drinking Water Standard

Well no.	Storet code	Parameter	U.M.	Sampling date													
				Jan. 94	April 94	July 94	Sept. 94	May 95	Oct. 95	A pr. 96	Oct. 96	A pr. 97	Sept. 97	Apr. 98	Oct. 98	Apr. 99	Sept. 99

Test Results

8-35																	
	76	Turbidity	NTU								—		13		2.3	<1	<1
	1045	Iron	ug/l	1050	1280	1000	815	2200	760	1300	750	730	4400	800	<50	1900	920
	31503	Tot. Coli	Coli/100 ml						92	800	23	680	19	5	170	<1	<1
	1051	Lead	ug/l										660		<5	<5	<5
	70300	TDS	mg/l												600	310	290

8-59	515	TDS	mg/l					570							330	420	420
	76	Turbidy	NTU	3	2.6	4.4	3.2	4.5		1.2	6.5		6.1	4.7	1.4	<1	<1
	1045	Iron	ug/l	2340	3170	2330	2630	2200	2200	2000	1900	1700	2500	2200	<50	2400	3800
	31503	Tot. Coli	coli/100 ml						60	8000	41	280	290	1	<10	9	<1
	31616	Fecal Coil	col/100 ml				8										

8-72	515	TDS	mg/l			532									380	450	490
	76	Turbidity	NTU	4.5	3.7	5.8	2.3	4.8	1.2	1.1	4.3		2.6	7.5	12	1.2	<1
	1045	Iron	ug/l	2880	3170	2930	2850	2600	2400	2800	2800	2100	790	3200	<50	36000	5800
	31503	Tot. Coli	coli/100 ml						260	140	770	53	100	70	10	2	<1

GWD94991C.I.D./I 1.18.99

**Broward County
Public Works Department
Office of Integrated Waste Management Solid Waste Operations Division
S.W. Broward County Sanitary Landfill (Davie)**

Cluster #9

Ground Water Test Results

Above Drinking Water Standard

Well no.	Storet Code	Parameter	U.M.	Sampling date													
				Jan. 94	April 94	July 94	Sept 94	May 95	Oct 95	April 96	Oct. 96	Apr. 97	Sept. 97	Apr. 98	Oct. 98	Apr. 99	Sept 99
Test Results																	
9-36	515	TDS	mg/l			525		520							480	290	440
	76	Turbidity				6.1	1.9	3.6	1900		6.3	1800	3.5		1	3200	2400
	31503	Tot. Coll	Coll/100						78	39	63	500	T-100		<10	<1	<1

9-59	515	TDS	mg/l				Not	530							420	300	490
	76	Turbidity	NTU	7.8	6.4	7.7	information	7.6		1.1	8.2		6	7.1	1.2	<1	<1
	1045	Iron	ug/l	3950	4290	3300		3000	3380	2700	2900	2400	2800	2800	<50	3100	2400
	31503	Tot. Coli	coli/100 ml							26	16	640	3	2	60	<1	1

9-93	515	TDS	mg/l				504			520		510			460	290	480
	76	Turbidity	NTU	4.4	3.5	3.1	2.7	7.3		1.1	4.3		4.5	5.9	8.9	<1	<1
	1045	Iron	ug/l	2860	4060	2180	2590	2800	2300	2100	2400	1800	2500	2400	<50	2800	2400
	31503	Tot. Coli	coli/100 ml						670	30	500	1100	1	4200	<10	4	<1

GWD9499/C.I.DJ71.18.99

Broward County
Public Works Department
Office of Integrated Waste Management
Solid Waste Operations Division
S. W. Broward County Sanitary Landfill (Davie)

Cluster #11

Ground Water Test Results

Above Drinking Water Standard

Well no.	Storet code	Parameter	U.M.	Sampling date													
				Jan. 94	April 94	July 94	Sept. 94	May 95	Oct. 95	Apr. 96	Oct. 96	Apr. 97	Sept. 97	Apr. 98	Oct. 98	April 99	Sept. 99
Test Results																	
11-31	515	TDS	mg/l	1093	576	1127	1096	1200	940	1100	1100	1200	1000	1400	1000	1200	1100
	76	Turbidity	NTU	6	6.3	6.7	2.1	42	0	0	5.2	0	17	6.8	2.9	1.2	<1
	1045	Iron	ug/l	6770	11000	4960	3540	8700	3200	2800	8300	9800	5200	10000	<50	3300	2900
	31503	Tot. Coli	coli/100 ml						150	35	450	6200	2900	540	280	<1	1
11-57	515	TDS	mg/l			670	704	670	660	560	630	620	580	630	620	620	1000
	76	Turbidity	NTU	17.1	5.4	16.1	3.4	19	1.2		30	0	7.4	21	28	1.4	2.05
	1045	Iron	ug/l	68.6	8020	3700	2850	11000	2100	2400	4900	5200	2400	13000	<50	3300	2600
	31503	Tot. Coli	coll/100 ml						720	53	23	6700	450	0	<10	22	<1
11-75	515	TDS	mg/l	591	0	629	644	680		590	670	580	590	580	480	610	670
	76	Turbidity	NTU	2.9	2.1	3.5	3.1	2			8.6		11	6.9	5	<1	<1
	1045	Iron	ug/l	2710	2830	2990	2850	2500	2900	2200	3600	7600	6500	7800	<50	2200	2500
	31503	Tot. Coli	coll/100 ml						87	69	1100	4900	40		440	30	<1
11-100	515	TDS	mg/l	641		645	658	640	620	600	840	610	670		660	730	740
	76	Turbidity	NTU	11.2	7.7	19.7	5.4	10			13		22	16	3	1.9	<1
	1045	Iron	ug/l	5260	7910	4850	2960	18000	2800	2600	4400	4000	3600	16000	<50	11000	3600
	31503	Tot. Coli	coli/100 ml						650	260	220	6300	6300	25	30	<1	<1
	39175	Vinyl Chloride	ug/l						1.3		2.4	2.1	<1	<1	<1	1.5	<1

GWD9499/C...I.D./11.18.99

**Broward County
Public Works Department
Office of Integrated Waste Management
Solid Waste Operations Division
S. W. Broward County Sanitary Landfill (Davie)**

Cluster #21

Ground Water Test Results

Above Drinking Water Standard

Well no.	Storet code	Parameter	U.M.	Sampling date													
				Jan. 94	April 94	July 94	Sept. 94	May 95	Oct. 95	Apr. 96	Oct. 96	Apr. 97	Sept. 97	Apr. 98	Oct. 98	April 99	Sept. 99
Test Results																	
21-35	515	TDS	mg/l	Not information						710		630	530		410	590	400
	76	Turbidity	NTU						3.1	1.4	16	2.68	16	10	13	2.9	1.2
	1045	Iron	ug/l						6600	8800	13000	2200	5900	4100	<50	3500	1900
	31503	Tot. Coll	coll/100 ml						220	37	390	2400	500	8000	50	5	<1
21-62	515	TDS	mg/l	705	501	732	792	780	820	770	790	850	880	800	810	830	730
	76	Turbidity	NTU	12.7	6.9	15.9	5.1	5.8	1.6	1.2	11		18	14	1.5	<1	<1
	1045	Iron	ug/l	4720	8770	4820	4450	4300	3500	4400	4900	3400	50	7000	<50	5100	3900
	31503	Tot. Coll	coll/100 ml						680	370	720	1000	7	15	<10	6	2
	39175	Vinyl Chloride	ug/l									<1	<1	<1	<1	<1	1.8
21-85	515	TDS	mg/l	Not information					610	600	660	600	620	560	820	660	670
	76	Turbidity	NTU						3.8	4.4	8		18	17	1.5	0.39	<1
	1045	Iron	ug/l						5100	3900	4000	2800	4600	4500	<50	5400	4700
	31503	Tot. Coll	coll/100 ml							480	700	2400	4	5	<10	5	<1
	39175	Vinyl Chloride	ug/l								1.1		1.1		<1	<1	<1

GWD9499/C.I.D./11.18.99

Broward County
Public Works Department
Office of Integrated Waste Management
Solid Waste Operations Division
S. W. Broward County Sanitary Landfill (Davie)

Cluster #22

Ground Water Test Results

Above Drinking Water Standard

Well no.	Storet code	Parameter	U.M.	Sampling date													
				Jan. 94	April 94	July 94	Sept. 94	May 95	Oct. 95	Apr. 96	Oct. 96	Apr. 97	Sept. 97	Apr. 98	Oct. 98	April 99	Sept. 99
Test Results																	
22-34	76	Turbidity	NTU	22	4.3	12	9.2	43	1.1	3.2	19	2.45	13	11	2	3.9	2.8
	1045	Iron	ug/l	5260	15400	3910	3930	6400	2700	5000	2600	2300	3600	4000	<50	300	3700
	31503	Tot. Coll	coll/100 ml						71	37	5	42	100	23	10	4	1
22-60	76	Turbidity	NTU	16.8	3.3	16.7	7.2	37	4.1	5.1	18	10.07	9.5	11	13	2.7	5.2
	1045	Iron	ug/l	7180	4630	3910	3570	3400	2800	2500	2800	2700	2900	3600	<50	4200	5100
	31503	Tot. Coll	coll/100 ml						200	2600	1600	>8000	9900		100	1700	<1
22-91	76	Turbidity	NTU	7.2	2.7	5	4.7	8.8	4.6	4.8	9.6		4.7	7.6	9	<1	<1
	1045	Iron	ug/l	3630	3580	3040	2830	3400	2200	4500	3000	1900	2700	3200	<50	3400	2600
	31503	Tot. Coll	coll/100 ml						550	370	520	>8000	40		<10	<1	<1

GWD9499/C..I.D./11.18.99

Attachment D

Leachate and Rainfall Summary

**DAVIE LANDFILL
LEACHATE HAULED & RAINFALL
SUMMARY**

1988 THRU 1999

YEAR	TOTAL VOLUME	RAINFALL
1988 (Sept.-Dec.)	5,046,000	
1989	13,431, 300	
1990	16,385,500	
1991	11,930,337	
1992	4,983,000	**39.40
1993	10,149,409	53.91
1994	10,986,200	86.13
1995	11,296,897	60.36
1996	12,605,069	68.48
1997	9,028,457	76.47
1998	11,672,500	73.05
1999	11,634,800	75.76
2000		
2001		

**Rainfall reported starting June 1992.

Attachment E

Site Inspection Checklist

Please note that “O&M” is referred to throughout this document. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as “system operations” since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the five-year review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: <u>Davie Landfill</u>	Date of inspection: <u>3/20/00</u>
Location and Region:	EPA ID: <u>FLD980602288</u>
Agency, office or company leading the five-year review: <u>USACE</u>	Weather/temperature:
Remedy Includes (Check all that apply) <input checked="" type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	
<input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager <u>Ram Tewari</u> <u>project manager</u> <u>3/20/00</u> Name Title Date Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____	
2. O&M staff <u>Jerri Peters</u> <u>landfill manager</u> <u>3/20/00</u> Name Title Date Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____	

3. ☒ Local regulatory authorities and response agencies (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Town of Dade - Police & Fire Departments (No incident)

Contact (954) 797-1100

Name _____ Title _____ Date _____ Phone no. _____

Problems; suggestions; ☐ Report attached _____

☒ Agency Broward County - Department of Planning & Environmental Protection

Contact Semin Wass Engineer (954) 519-1460 (No incident)

Name _____ Title _____ Date _____ Phone no. _____

Problems; suggestions; ☐ Report attached _____

☒ Agency Florida Department of Environmental Protection

Contact Lee Hoefert S.W. Manager 561-681-6668

Name _____ Title _____ Date _____ Phone no. (No incident)

Problems; suggestions; ☐ Report attached _____

Agency _____

Contact _____

Name _____ Title _____ Date _____ Phone no. _____

Problems; suggestions; ☐ Report attached _____

4. Other interviews (optional) ☒ Report attached.

See 5 YR Review Report

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1.	O&M Manual and As-Built <input type="checkbox"/> As-builts <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Maintenance Logs <input type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A
Remarks <u>Daily inspections</u>			
2.	Site Specific Health and Safety Plan <input type="checkbox"/> Contingency plan/emergency response plan	<input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> Up to date <input type="checkbox"/> N/A
Remarks <u>each employee is give a copy of plan</u>			
3.	O&M and OSHA Training Records <input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A	
Remarks _____			
4.	Permits and Service Agreements <input checked="" type="checkbox"/> Air discharge permit <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Readily available <input checked="" type="checkbox"/> Waste disposal, POTW <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Other permits <u>Landfill closure</u> <input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A	
Remarks <u>Solid waste + Title V</u>			
5.	Gas Generation Records <input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A	
Remarks <u>Monthly + Qtrly</u>			
6.	Settlement Monument Records <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
Remarks _____			
7.	Groundwater Monitoring Records <input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A	
Remarks <u>Quarterly</u>			
8.	Leachate Extraction Records <input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A	
Remarks <u>Quarterly</u>			
9.	Discharge Compliance Records <input checked="" type="checkbox"/> Air <input type="checkbox"/> Readily available <input type="checkbox"/> Water (effluent) <input type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> Up to date <input type="checkbox"/> N/A	
Remarks <u>Air - Title V In compliance</u>			

10.	Daily Access/Security Logs <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A Remarks _____ _____																														
IV. O&M COSTS																															
1.	O&M Organization <input type="checkbox"/> State in-house <input type="checkbox"/> Contractor for State <input checked="" type="checkbox"/> PRP in-house <input type="checkbox"/> Contractor for PRP <input type="checkbox"/> Other _____																														
2.	O&M Cost Records <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Up to date <input checked="" type="checkbox"/> Funding mechanism/agreement in place Original O&M cost estimate <u>Varies annually</u> <input type="checkbox"/> Breakdown attached <p style="text-align: center;">Total annual cost by year for review period if available</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">From <u>10/1/98</u> To <u>9/30/99</u></td> <td style="width: 30%; text-align: right;"><u>\$ 421,700</u></td> <td style="width: 40%;"><input checked="" type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;"><small>Dates</small></td> <td style="text-align: center;"><small>Total cost</small></td> <td></td> </tr> <tr> <td>From <u>10/1/97</u> To <u>9/30/98</u></td> <td style="text-align: right;"><u>\$ 343,000</u></td> <td><input checked="" type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;"><small>Dates</small></td> <td style="text-align: center;"><small>Total cost</small></td> <td></td> </tr> <tr> <td>From <u>10/1/96</u> To <u>9/30/97</u></td> <td style="text-align: right;"><u>\$ 340,900</u></td> <td><input checked="" type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;"><small>Dates</small></td> <td style="text-align: center;"><small>Total cost</small></td> <td></td> </tr> <tr> <td>From <u>10/1/95</u> To <u>9/30/96</u></td> <td style="text-align: right;"><u>\$ 354,700</u></td> <td><input checked="" type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;"><small>Dates</small></td> <td style="text-align: center;"><small>Total cost</small></td> <td></td> </tr> <tr> <td>From <u>10/1/94</u> To <u>9/30/95</u></td> <td style="text-align: right;"><u>\$ 431,300</u></td> <td><input checked="" type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;"><small>Dates</small></td> <td style="text-align: center;"><small>Total cost</small></td> <td></td> </tr> </table>	From <u>10/1/98</u> To <u>9/30/99</u>	<u>\$ 421,700</u>	<input checked="" type="checkbox"/> Breakdown attached	<small>Dates</small>	<small>Total cost</small>		From <u>10/1/97</u> To <u>9/30/98</u>	<u>\$ 343,000</u>	<input checked="" type="checkbox"/> Breakdown attached	<small>Dates</small>	<small>Total cost</small>		From <u>10/1/96</u> To <u>9/30/97</u>	<u>\$ 340,900</u>	<input checked="" type="checkbox"/> Breakdown attached	<small>Dates</small>	<small>Total cost</small>		From <u>10/1/95</u> To <u>9/30/96</u>	<u>\$ 354,700</u>	<input checked="" type="checkbox"/> Breakdown attached	<small>Dates</small>	<small>Total cost</small>		From <u>10/1/94</u> To <u>9/30/95</u>	<u>\$ 431,300</u>	<input checked="" type="checkbox"/> Breakdown attached	<small>Dates</small>	<small>Total cost</small>	
From <u>10/1/98</u> To <u>9/30/99</u>	<u>\$ 421,700</u>	<input checked="" type="checkbox"/> Breakdown attached																													
<small>Dates</small>	<small>Total cost</small>																														
From <u>10/1/97</u> To <u>9/30/98</u>	<u>\$ 343,000</u>	<input checked="" type="checkbox"/> Breakdown attached																													
<small>Dates</small>	<small>Total cost</small>																														
From <u>10/1/96</u> To <u>9/30/97</u>	<u>\$ 340,900</u>	<input checked="" type="checkbox"/> Breakdown attached																													
<small>Dates</small>	<small>Total cost</small>																														
From <u>10/1/95</u> To <u>9/30/96</u>	<u>\$ 354,700</u>	<input checked="" type="checkbox"/> Breakdown attached																													
<small>Dates</small>	<small>Total cost</small>																														
From <u>10/1/94</u> To <u>9/30/95</u>	<u>\$ 431,300</u>	<input checked="" type="checkbox"/> Breakdown attached																													
<small>Dates</small>	<small>Total cost</small>																														
3.	Unanticipated or Unusually High O&M Costs During Review Period (Normal O&M cost: <u>\$250,000</u>) Describe costs and reasons: <u>Costs associated with park activities -</u> <u>funds for water & sewer service, Office trailer,</u> <u>land shaping maintenance,</u> <u>Major repairs to LEA system</u> <u>grading, drainage improvements due to</u> <u>subsidence,</u>																														
V. GENERAL SITE CONDITIONS																															
Whenever possible, actual site conditions should be documented with photographs.																															
A. Fencing	<u>Yes</u>																														

1.	Fencing damaged	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Gates secured	<input type="checkbox"/> N/A
Remarks _____				
B. Site Access				
1.	Access restrictions, signs, other security measures	<input type="checkbox"/> Location shown on map	<input type="checkbox"/> N/A	
Remarks <u>Access controlled.</u>				
C. Perimeter Roads				
1.	Roads damaged	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Roads adequate	<input type="checkbox"/> N/A
Remarks _____				
D. General				
1.	Vandalism/trespassing	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident	
Remarks <u>B.C. repairs as nec.</u>				
2.	Land use changes onsite	<input checked="" type="checkbox"/> N/A		
Remarks _____				
3.	Land use changes offsite	<input checked="" type="checkbox"/> N/A		
Remarks _____				
4.	Institutional controls (site conditions imply institutional controls not being enforced)			<input checked="" type="checkbox"/> N/A
Agency _____				
Contact _____				
<div style="display: flex; justify-content: space-between;"> Name _____ Title _____ Date _____ Phone no. _____ </div>				
Problems; suggestions; <input type="checkbox"/> Report attached _____				
VI. LANDFILL COVERS <input type="checkbox"/> Applicable <input type="checkbox"/> Not applicable				
A. Landfill Surface				
1.	Settlement (Low spots)	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident	
Areal extent _____ Depth _____				
Remarks <u>Same settlement as mentioned in report.</u>				

2.	Cracks <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Cracking not evident Lengths _____ Widths _____ Depths _____ Remarks _____
3.	Erosion <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Erosion not evident Areal extent _____ Depth _____ Remarks _____
4.	Holes <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Holes not evident Areal extent _____ Depth _____ Remarks _____
5.	Vegetative Cover <input checked="" type="checkbox"/> Grass <input checked="" type="checkbox"/> Cover properly established <input type="checkbox"/> No signs of stress <input checked="" type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram) Remarks _____
6.	Alternative Cover (armored rock, concrete, etc.) <input checked="" type="checkbox"/> N/A Remarks _____
7.	Bulges <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Bulges not evident Areal extent _____ Height _____ Remarks _____
8.	Wet Areas/Water Damage <input type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Wet areas <input type="checkbox"/> Location shown on site map Areal extent _____ <input checked="" type="checkbox"/> Ponding <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Seeps <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Soft subgrade <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks <u>some ponding in flat areas due to recent heavy rains.</u>
9.	Slope Instability <input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No evidence of slope instability Areal extent _____ Remarks _____
B.	Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not applicable (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1.	Flows Bypass Bench	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
Remarks _____			
2.	Bench Breached	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
Remarks _____			
3.	Bench Overtopped	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
Remarks _____			
C.	Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not applicable (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
Areal extent _____ Depth _____			
Remarks _____			
2.	Material Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation
Material type _____ Areal extent _____			
Remarks _____			
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion
Areal extent _____ Depth _____			
Remarks _____			
4.	Undercutting	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting
Areal extent _____ Depth _____			
Remarks _____			
5.	Obstructions	Type _____	<input type="checkbox"/> No obstructions
<input type="checkbox"/> Location shown on site map		Areal extent _____	
Size _____			
Remarks _____			

6.	Excessive Vegetative Growth Type _____ <input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____
D.	Cover Penetrations <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not applicable
1.	Gas Vents <input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> N/A Remarks _____
2.	Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> N/A Remarks _____
3.	Monitoring Wells (within surface area of landfill) <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> N/A Remarks _____
4.	Leachate Extraction Wells <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> N/A Remarks _____
5.	Settlement Monuments <input type="checkbox"/> Located <input type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A Remarks _____
E.	Gas Collection and Treatment
1.	Gas Treatment Facilities <input checked="" type="checkbox"/> Flaring <input checked="" type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____

2.	Gas Collection Wells, Manifolds and Piping <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____
F.	Cover Drainage Layer <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not applicable
1.	Outlet Pipes Inspected <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____
2.	Outlet Rock Inspected <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____
G.	Detention/Sedimentation Ponds <input type="checkbox"/> Applicable <input type="checkbox"/> Not applicable
1.	Siltation Areal extent _____ Depth _____ <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Siltation not evident Remarks _____ _____
2.	Erosion Areal extent _____ Depth _____ <input checked="" type="checkbox"/> Erosion not evident Remarks _____ _____
3.	Outlet Works <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____
4.	Dam <input type="checkbox"/> Functioning <input checked="" type="checkbox"/> N/A Remarks _____ _____
H.	Retaining Walls <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not applicable
1.	Deformations <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Deformation not evident Horizontal displacement _____ Vertical displacement _____ Rotational displacement _____ Remarks _____ _____
2.	Degradation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Degradation not evident Remarks _____ _____

I. Perimeter Ditches/Off-Site Discharge <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not applicable	
1.	Siltation <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Siltation not evident Areal extent _____ Depth _____ Remarks _____
2.	Vegetative Growth <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Vegetation does not impede flow Areal extent _____ Type _____ Remarks _____
3.	Erosion <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Erosion not evident Areal extent _____ Depth _____ Remarks _____
4.	Discharge Structure <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____
VII. VERTICAL BARRIER WALLS <input type="checkbox"/> Applicable <input type="checkbox"/> Not applicable	
1.	Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident Areal extent _____ Depth _____ Remarks _____
2.	Performance Monitoring Type of monitoring _____ <input type="checkbox"/> Performance not monitored Frequency _____ <input type="checkbox"/> Evidence of breaching Remarks _____
VIII. GROUNDWATER/SURFACE WATER REMEDIES <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not applicable	
A.	Groundwater Extraction Wells, Pumps, and Pipelines <input type="checkbox"/> Applicable <input type="checkbox"/> Not applicable

1.	Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____ _____ _____
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____ _____
B. Surface Water Collection Structures, Pumps, and Pipelines <input type="checkbox"/> Applicable <input type="checkbox"/> Not applicable	
1.	Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____ _____
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____ _____
C. Treatment System <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not applicable	
1.	Treatment Train (Check components that apply) <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <input type="checkbox"/> Metals removal <input type="checkbox"/> Air stripping <input type="checkbox"/> Filters _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ </div> <div style="width: 30%;"> <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Others _____ <input type="checkbox"/> Needs O&M </div> <div style="width: 30%;"> <input type="checkbox"/> Bioremediation </div> </div> Remarks _____ _____ _____
2.	Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____ _____
3.	Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs O&M Remarks _____ _____ _____

4.	Discharge Structure and Appurtenances <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____	
5.	Treatment Building(s) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks _____ _____	
6.	Monitoring Wells (pump and treatment remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____ _____	
D.	Monitored Natural Attenuation	
1.	Monitoring Wells (natural attenuation remedy) <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells located <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____ _____	

IX. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

X. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

[illegible]

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

[illegible]

C. Early Indicators of Potential Remedy Failure

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Exhibit 1



Photograph #1

March 20, 2000

Location: Davie Landfill Superfund Site, Broward County, Davie, Florida.

Description: View of DLS behind bordering Dairy Farm. The Northmound is to the left and the Southmound is to the right [*facing east, from shotgun rd.*].

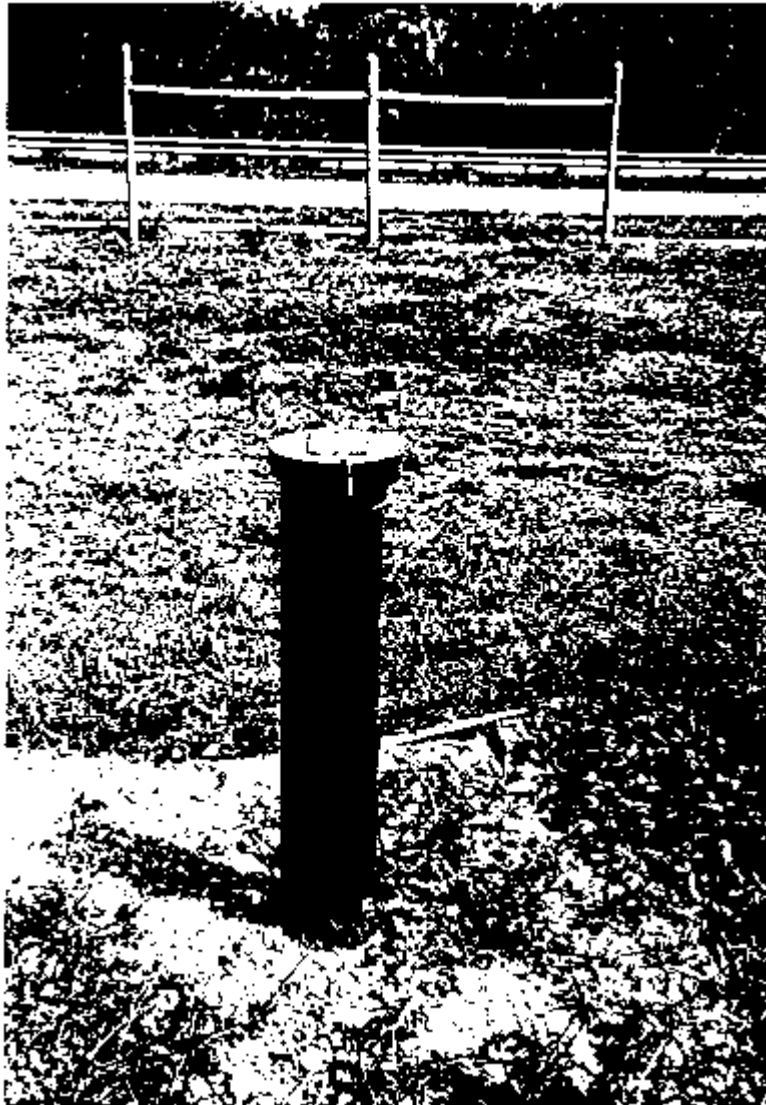


Photograph #2

March 20, 2000

Location: Davie Landfill Superfund Site, Broward County, Davie, Florida.

Description: Nature pond (former Sluge lagoon) shows Egret and Ducks: [*facing northeast*].



Photograph #3

March 20, 2000

Location: Davie Landfill Superfund Site, Broward County, Davie, Florida.

Description: Close up of MW in cluster #8 shows locked protector casing: [*facing east, from east property boundary*].



Photograph #4

March 20, 2000

Location: Davie Landfill Superfund Site, Broward County, Davie, Florida.

Description: View of nature pond with northmound in background: *[facing northeast, from road]*.



Photograph #5

March 20, 2000

Location: Davie Landfill Superfund Site, Broward County, Davie, Florida.

Description: MW cluster #8, MWs are in good condition, clearly identified and are easily accessible: *[facing northeast, from cluster #8 next to Boy Scout Rd.]*.



Photograph #6

March 20, 2000

Location: Davie Landfill Superfund Site, Broward County, Davie, Florida.

Description: Main Leachate Sump Station with control panels: *[facing south, southmound in background]*.

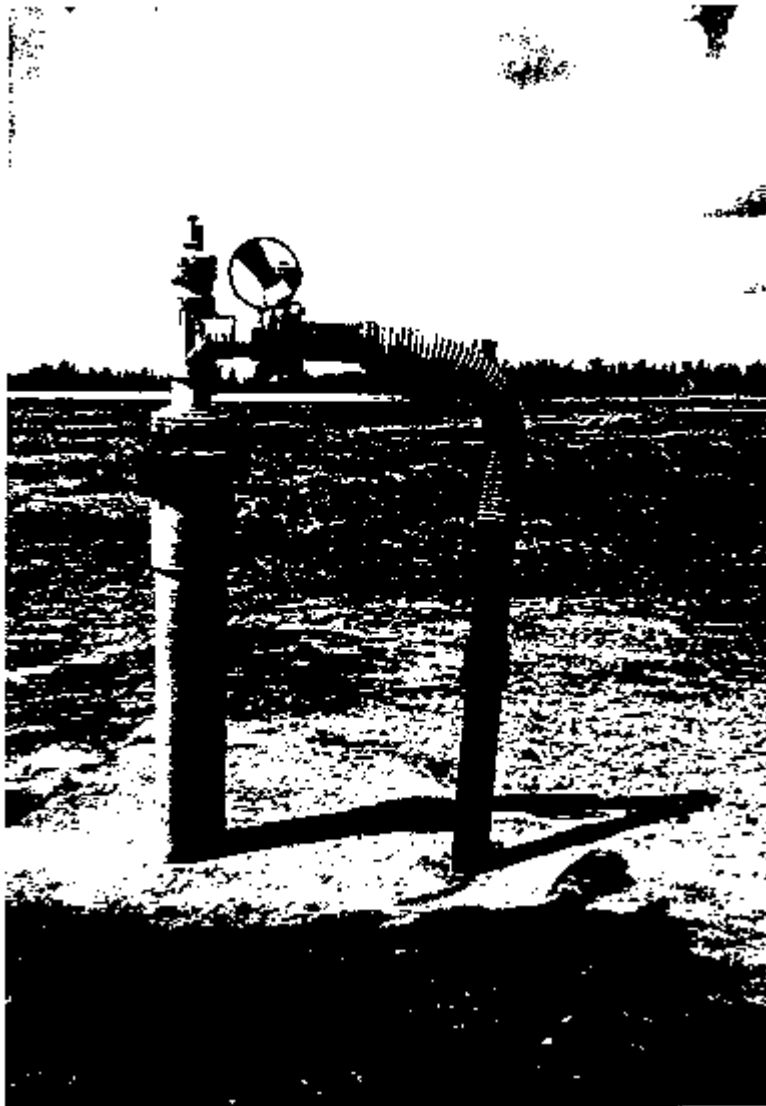


Photograph #7

March 20, 2000

Location: Davie Landfill Superfund Site, Broward County, Davie, Florida.

Description: MW cluster # 11, shows some settlement along berm: *[facing east, along southern border]*.

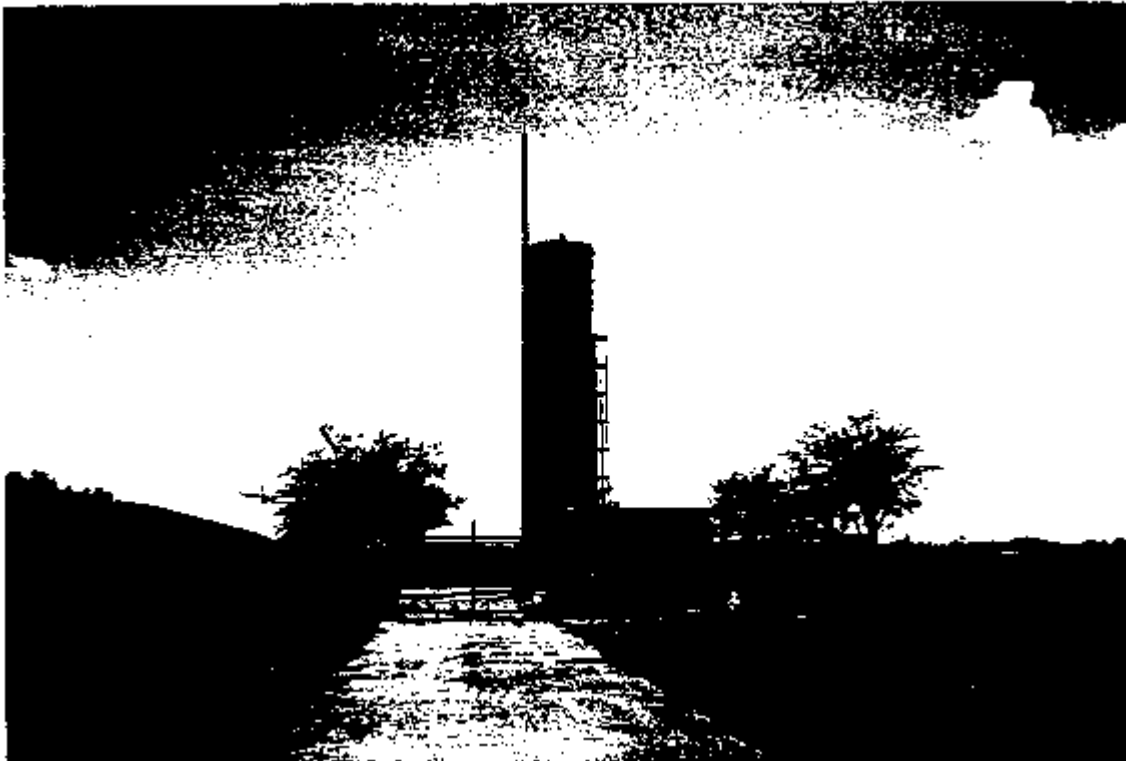


Photograph #8

March 20, 2000

Location: Davie Landfill Superfund Site, Broward County, Davie, Florida.

Description: Close up of landfill gas extraction well on North Mound: *[facing north, from top of mound]*.

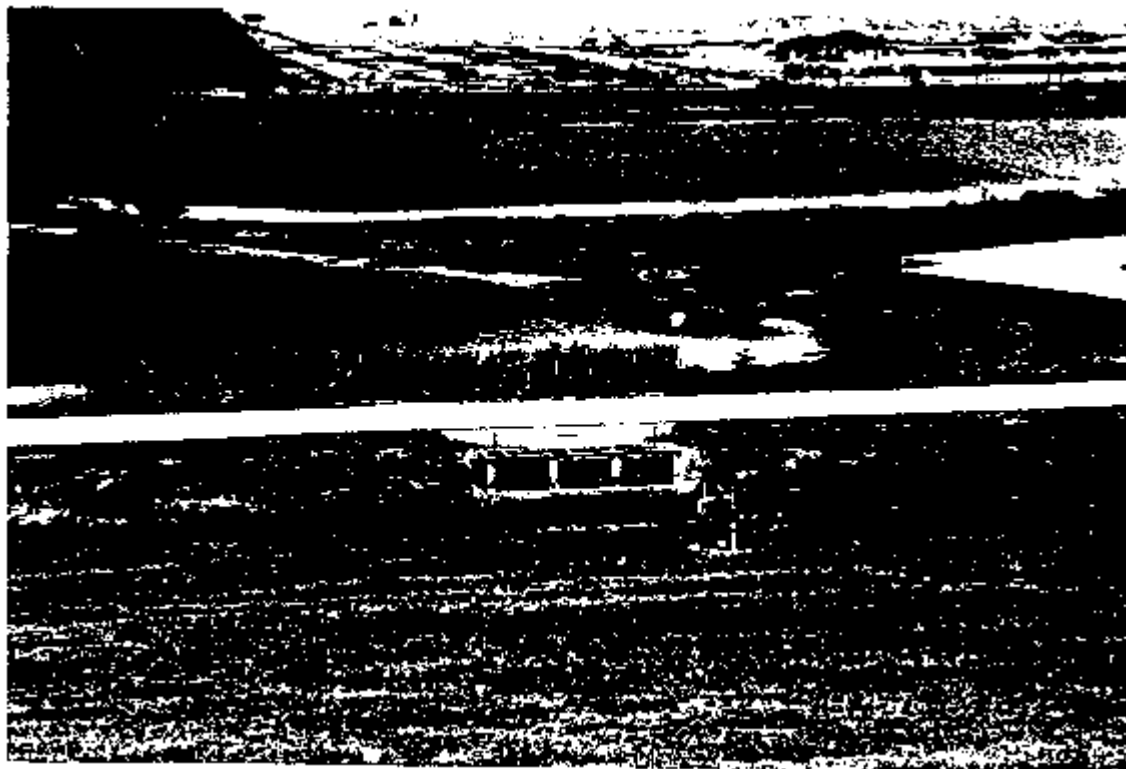


Photograph #9

March 20, 2000

Location: Davie Landfill Superfund Site, Broward County, Davie, Florida.

Description: The DLS flare system; locked and secure: *[facing south, along western border]*.



Photograph #10

March 20, 2000

Location: Davie Landfill Site Superfund Site, Broward County, Davie, Florida.

Description: Drainage Culvert to Lake #1, to the right is lake #2: *[facing east, from north mound]*.

Exhibit 1



Florida Department of Environmental Protection
Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, FL 32399-2400

Certification of Construction Completion of a Solid Waste Management Facility

DEP Construction Permit No: SF 06-143540 County: BROWARD
Name of Project: Closure of Broward County Landfill Facility at Davie
Name of Owner: BROWARD COUNTY (CIWM SWOD)
Name of Engineer: Design: P.B.S. & J, Inc & WET, Inc, Site: H&S, PC & County SWOI
Type of Project: General Site Works contract for overall closure of
a solid waste disposal facility. Closure work was done in phases.
Cost: Estimate \$ 4.5 million Actual \$ 4.8 million
Site Design: Quantity: N.A. ton/day Site Acreage: 210 Acres
Deviations from Plans and Application Approved by DEP: There was no deviation
from Plans. All specific conditions requirements pertaining to
construction, were met. Conceptual plans as well as engineering
plans were submitted, reviewed & approved by FDEP (WPB).
Coordination work for plans & Application was done by P.B.S. & J, Inc.
Address and Telephone No. of Site: Broward County Landfill, 4001 S.W.
142nd Avenue, Davie, Florida, Tel: (305) 370-3797/3798
Name(s) of Site Supervisor: Jerry Peters, Supt. Tel: (305) 680-0088
Date Site inspection is requested: Week of 19-23 December, Prior notice is requested.
This is to certify that, with the exception of any deviation noted above, the construction of the
project has been completed in substantial accordance with the plans authorized by Construction

Permit No.: SF 06-143540 Dated: May 04, 1988

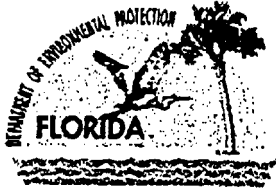
Date: NOVEMBER 10, 1994

R. J. Dwyer

Signature of Professional Engineer, No. 46767

⊗ Closure work was done in phases.
Cost of the final phase.

Exhibit 2



Department of Environmental Protection

Lawton Chiles
Governor

Southeast District
P.O. Box 15425
West Palm Beach, Florida 33416

Virginia B. Wetherell
Secretary

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

March 3, 1995

Ms. Mary Beth Busutil
Director, Solid Waste Operations Div.
Office of Integrated Waste Management
201 South Andrews Avenue
Fort Lauderdale, FL 33301-1831

Broward County
SW -BCSL
Permit Files

Re: Declaration of Restrictions - Broward County Sanitary Landfill
GMS ID# - 5006C06070

Dear Ms. Busutil:

The Department acknowledges receipt of the Declaration of Landfill Closure recorded February 7, 1995 in the official records of Broward County, along with the final survey. Pursuant to Florida Administrative Code 62-701.074(5), the notice of termination of operations and closing of the facility has been received. The official date of landfill closing for purposes of determining the long term care period shall be February 7, 1995.

If you have any questions, please contact me at telephone number 407/433-2650, extension 110.

Sincerely,

Joseph Lurix, Engineer
Solid Waste Program

cc: Fred Wick, SW/TLH
Dan DiDomenico, BWC/TLH
Jeff Braswell, OGC/TLH
Barbara Dick, USEPA - Region IV
Kevin Burger, BCCDNRP